

UK Patent Application (12) GB (19) 2 280 329 (13) A

(43) Date of A Publication 25.01.1995

(21) Application No 9313429.4

(22) Date of Filing 29.06.1993

(71) Applicant(s)
Primax Electronics Company Limited

(Incorporated in Taiwan)

3F No 123 Neihu Road Sec 1, Neihu District, Taipei,
Taiwan

(72) Inventor(s)
Ampere Pan

(74) Agent and/or Address for Service

Guy Selby-Lowndes
Moonrakers, Durfold Wood, Plaistow,
BILLINGSHURST, West Sussex, RH14 0PL,
United Kingdom

(51) INT CL⁶
H04N 1/00, G06F 3/00

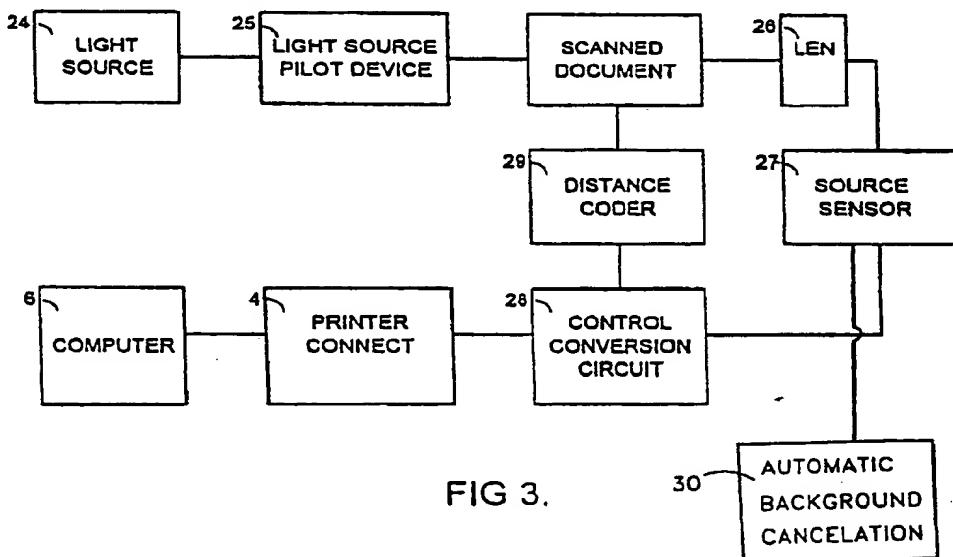
(52) UK CL (Edition N)
H4F FCA FS25R FS27L FS27T1 FS30H FS30K FS82
FS83B
G4A AKS

(56) Documents Cited
EP 0484888 A1 EP 0231697 A1

(58) Field of Search
UK CL (Edition M) G4A AKS, H4F FAAN FCA
INT CL⁵ G06F 3/00, H04N 1/00
Online databases: WPI

(54) Pen type input image scanner connected to printer port of a computer

(57) A hand held, pen type image input scanner comprises a light source 24, a photosensor 27 and a distance/position coder 29 in a housing (21, figure 2). Coded data is sent over printer connector 4 to the printer port of a computer 6. Use of the position coder 29 allows the desired part only of an image thus saving memory and avoiding the need to delete unwanted information. Automatic background correction 30 compensates for variations in illumination intensity caused eg by holding the scanner at an angle to the paper.



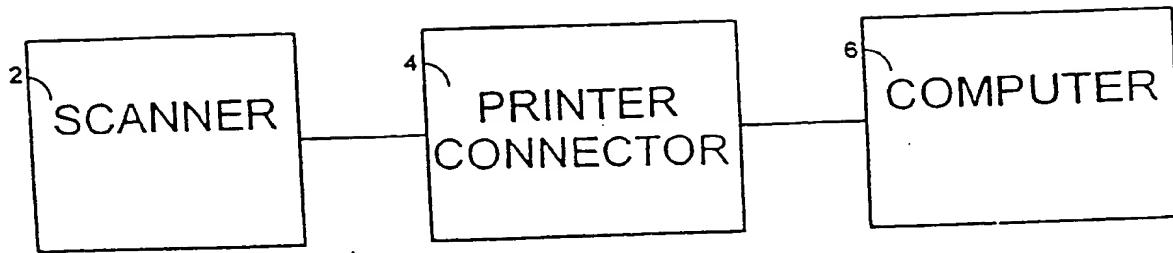


FIG 1.

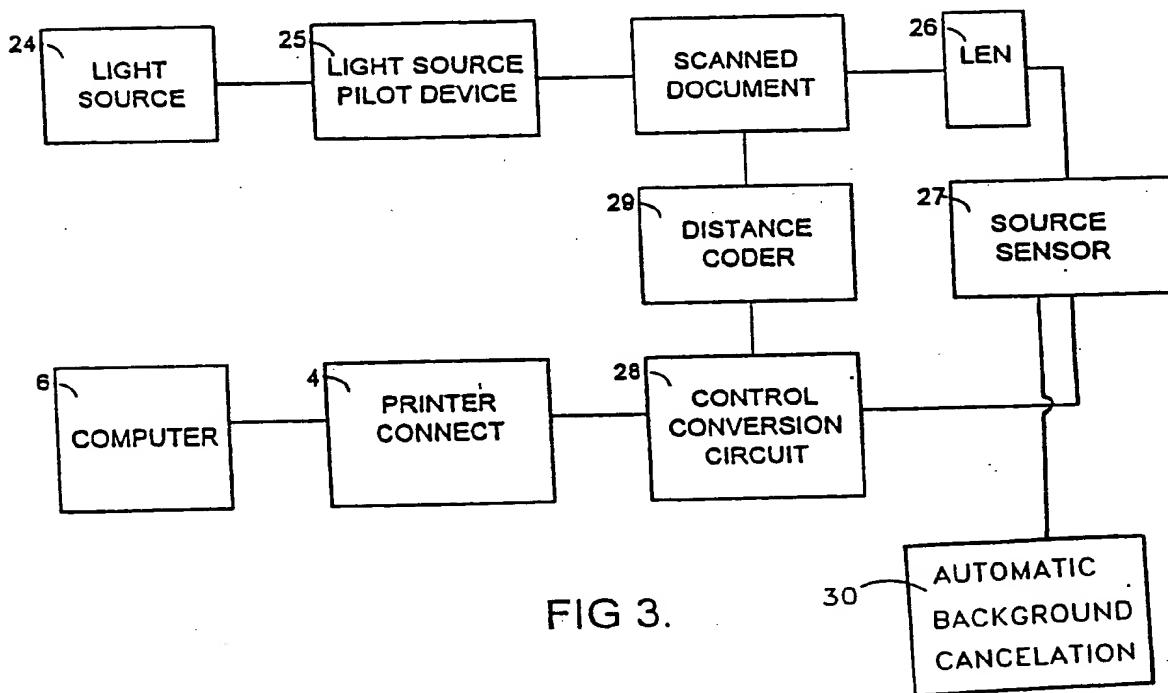


FIG 3.

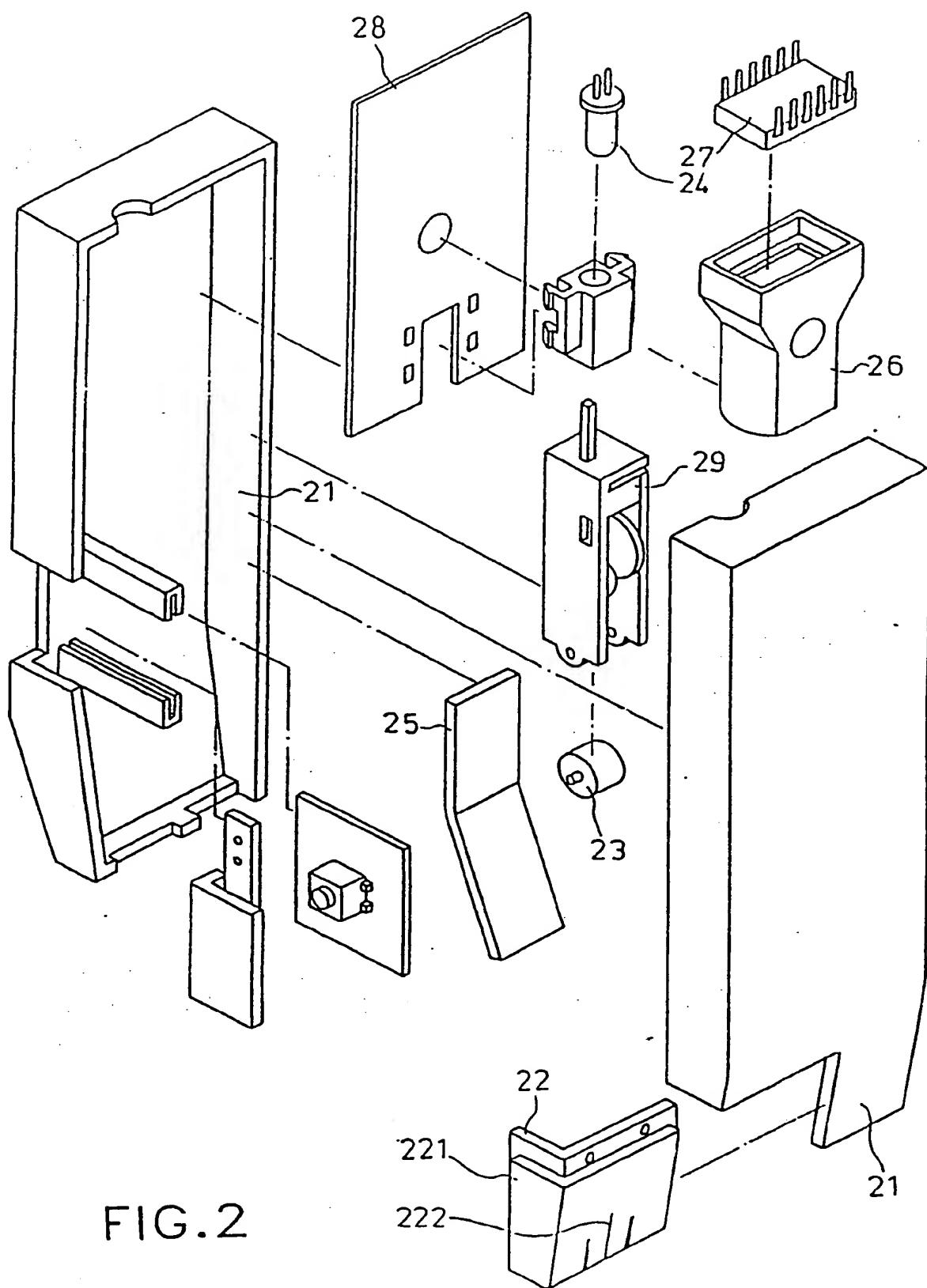


FIG.2

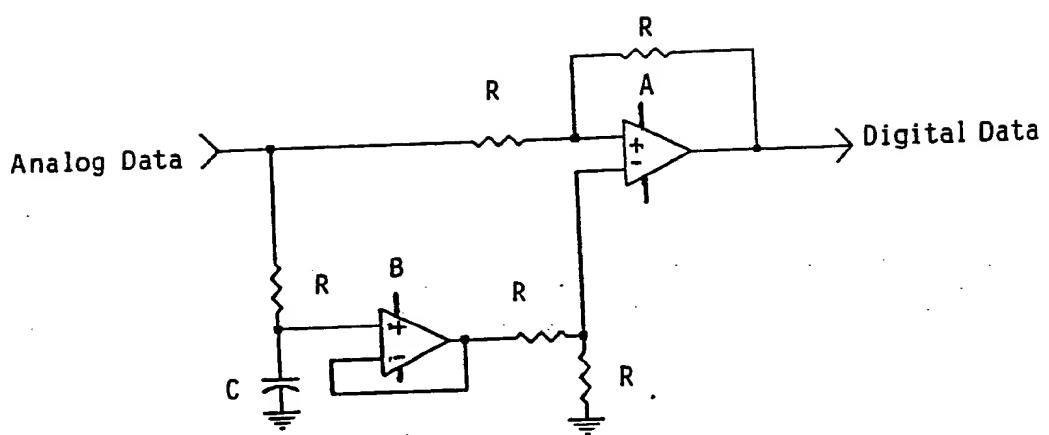


FIG. 4

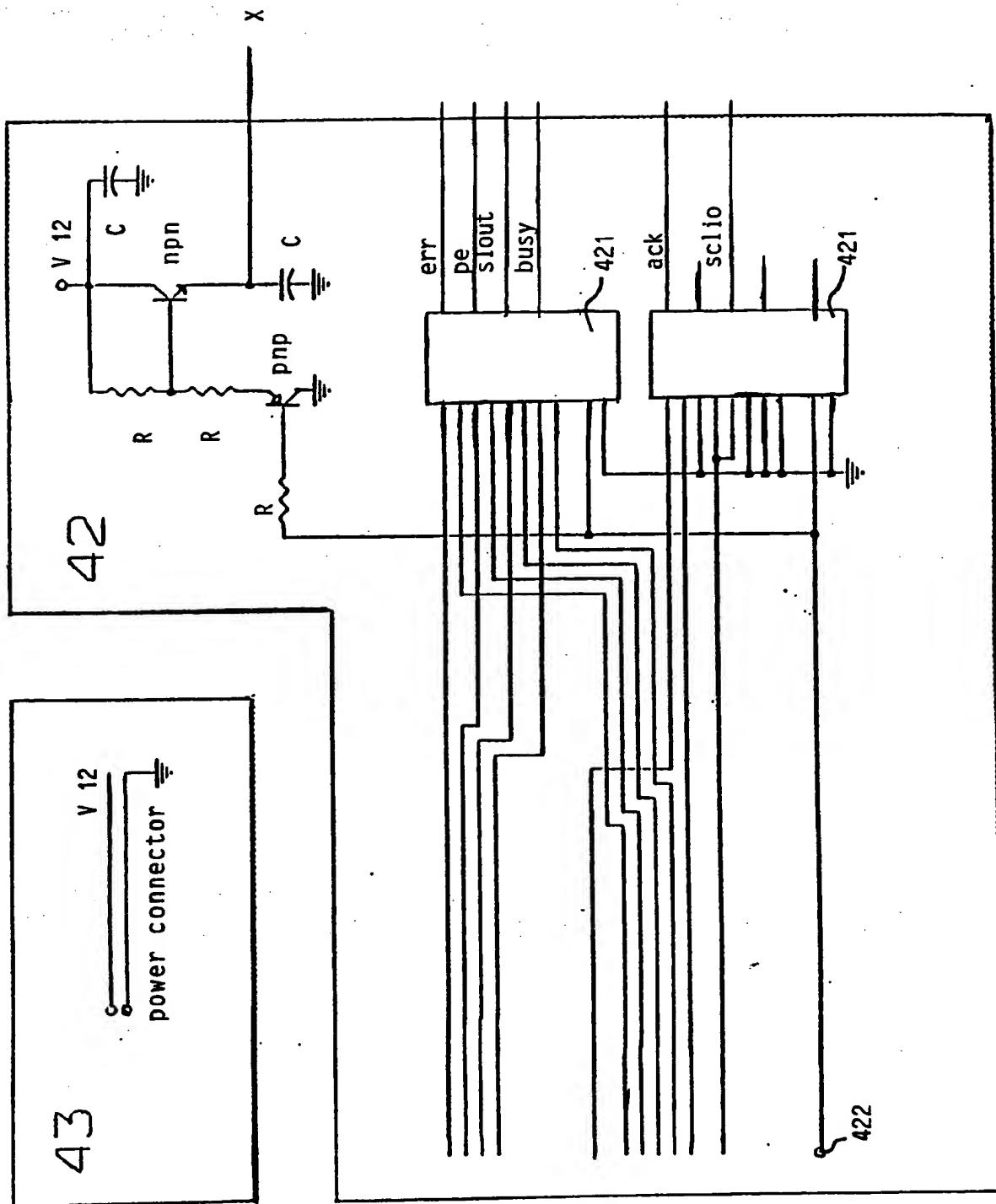


FIGURE 5A

5/5

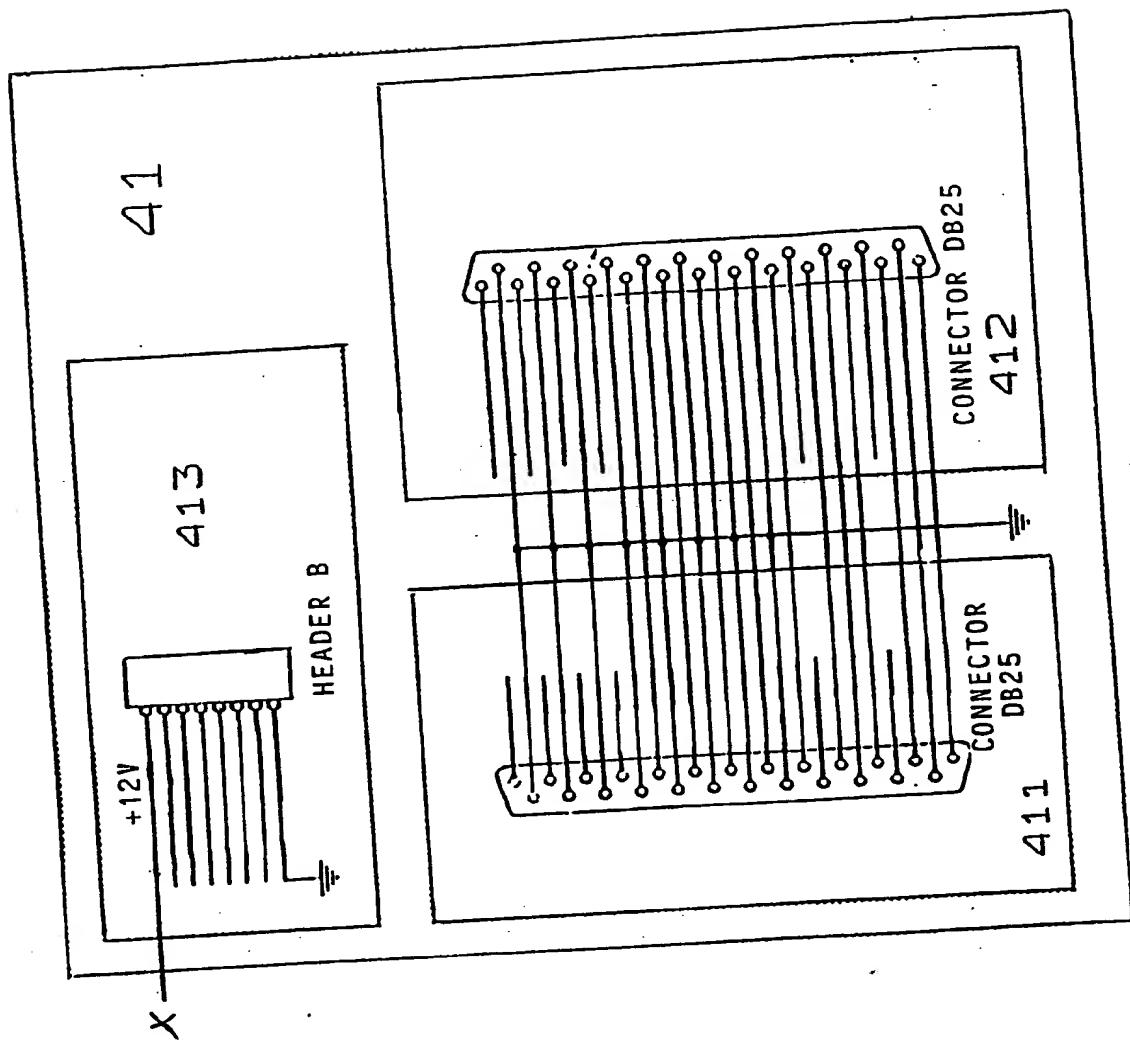


FIGURE 5B

A PEN TYPE SCANNER DIRECTLY LINKABLE TO PRINTER PORT OF COMPUTER

BACKGROUND OF THE INVENTION

This invention relates to a scanner device, and particularly to a pen type scanner device which is directly linkable to printer port of computer and functioning like a pen to pick up paragraph of a writing 5 for directly scanning into the computer.

The conventional scanners, such as a platform type and handy type, relate to the devices which may scan over flat documents. They are good at scanning over a whole-page image though however, they are quite 10 limited with respect to reading/picking up or entering a line or a sentence of words image.

The first reason is because that the conventional scanners are designated with a whole page as their scan unit while if intended for scanning words 15 image line by line a paragraph to be scanned should be present in conjunction with entry of parameters, or a paragraph desired is selected from the page scanned. Not only a paregraph/line/sentence of words desired could not be instantly selected as required but also it would cause a waste of time, memory and processing due to the 20

entry and processing of image not required.

Besides the conventional image scanners can not scan over a curved surface formed on the pages of a thick book. And for scanning a broad and long page they 5 have to use a greater number of pixel sensors and a much more sophisticated optical system.

In view of this the inventor has dedicated to a research in finding a scanner which can be applicable to scanning by a line/sentence/paragraph. Through 10 accumulated experiences relating to the design and manufacture in this field, a pen type scanner linkable to printer port of computer has been developed in success to meet the aim for real-time and direct picking words image.

15 SUMMARY OF THE INVENTION

One object of this invention is to provide a pen type scanner which is directly linkable to printer port of computer and available for scanning the part desired for entry by lines or sentences in order to save the 20 user from a troublesome editing.

Another object of this invention is to provide a pen type scanner which is directly linkable to printer port of computer and able to avoid the transmission and

processing of data not required in order to speed up data transmission and processing without any additional interface card by means of direct link to printer port of computer.

5 Still another object of this invention is to provide a pen type scanner which is directly linkable to printer port of computer and it can be accomplished with pixel components and simpler lens because of small sensing message area required.

10 Still another object of this invention is to provide a pen type scanner which is directly linkable to printer port of computer and is suitable to the use of cells as a power source because of small size, smart outlook and economical power consumption.

15 In consideration of objects above mentioned, the pen type scanner directly linkable to printer port of computer according to the present invention comprises a pen-sized housing, a scanning position auxiliary device located in the front of the housing, a scanning position auxiliary device located in the front of the housing, a view window mounted on the scanning position auxiliary device with an adequate width for receiving a series of image data in conjunction with a light source sensor by using a pixel. Because data entered are all related to

those sentences/paragraphs as required the volume of data is small. Further including a code for sensing horizontal transfer, a control conversion circuit for entering image data into the computer by virtue of printer port, in conjunction with software support. It is processed by taking the central line of the scanned lines as the object, and obtaining information data by tracking the trace to prevent errors arising from inclining scanned lines due to miss-alignment. It is also incorporated with front or back space setting functions to copy with front and back alignment conditions during operation, and serving real-time paragraph scanning and direct editing purposes.

BRIEF DESCRIPTION OF THE DRAWINGS

15 The present invention will now be described by way of example, with reference to the annexed drawings.

FIG. 1 is a diagram showing the connection of a pen-type scanner directly linkable to printer port of computer according to the present invention.

20 FIG. 2 is an exploded view of a pen-type scanner directly linkable to printer port of computer according to the present invention.

FIG. 3 is a block diagram showing a circuit used in a pen-type scanner directly linkable to printer port of computer according to the present invention.

FIG. 4 is a circuit diagram of an automatic background cancellation device according to the present invention.

5 FIG. 5 is a circuit diagram of a printer connector according to the present invention.

DETAILED DESCRIPTION OF THE
PREFERRED EMBODIMENT

Referring to FIG.1, a diagram showing that a pen type scanner directly linkable to printer port of computer according to the present invention. The scanner 2 relates to scanning over paragraph of document at a unit of array. Providing that a conventional scanner is scanning from the top to the bottom while the scanner of this invention is from the left to the right. More specifically the pen type scanner directly linkable to printer port of computer manages its scanning way from the left to the right or the right to the left with the major difference between with the top to the bottom or bottom to the top. The light source projected from the scanner 2 is reflected by paper top and cast by a len onto C.C.D.(Charge Coupled Device) by virtue of a view window. On C.C.D. image signals are converted to voltage signals which are being processed by the scanner 2 just like a conventional scanner, and transmitted into

the computer 6 by virtue of the printer connector 4. After data signals scanned by the scanner 2 enter the computer 6, in conjunction with a CAD software, they can be converted to corresponding character codes for a wide variety of applications. It operates in the background of the computer operation system, and preprocessing, reworking, and cutting the received information data to abstract the one as it is closest to the marked central paragraph thereafter, optical character reader (OCR) are applied and by incorporating flexibly with character data base to make spell-check, the set-up of the scan start (by pressing down the pen) and end (by releasing the pen) control codes to edit into complete corresponding character interchange codes, then, with the operation system to intercept the input passage of the keyboard to simulate keyboard signal and input them directly into the application software in using to create varies applications.

Referring to FIG. 2, an exploded view showing a pen type scanner directly linkable to printer port of computer wherein the scanner 2 comprises a housing 21, a scanning position auxiliary device 22, a directional device 23, a light source 24, a light source pilot device 25, a lens 26, a light source sensor 27, a control conversion circuit 28, a distance code 29 and a cable 30.

The housing of the scanner 2 is designed

resembling a pen to permit the user to hold and move in facility. The reflection signal end for receiving document in the front of the housing includes a scanning position auxiliary device 22 which includes a view window 221, a center line 222 marked thereon. When the user intends to enter certain paragraph of document by scanning the only job required is to cover the view window 221 completely onto the paragraph desired. Because allowed easily to check up whether or not the scanner has aligned with the paragraph desired. In addition a center line 222 is mounted on the view window 221 to enable the user to measure whether or not a deviation from the paragraph desired for scanning occurs during the process. Meanwhile a directional device 23 which is a directional roller is added to increase stability for linear scanning.

Referring to FIG. 3, a block diagram showing the pen typescanner directly linkable to printer port of computer wherein for scanning light beams are being emitted from the light source 24. Subject to the shape of a pen for the present invention, providing the light source 24 is mounted at leading end of the pen it might result in holding problem because of bulk dimensions at the leading end of the pen; providing the light source 24 is changed to the intermediate part of the pen it would cause another problem - i.e. light beams could not be evenly projected onto the document desired for scanning. For this reason a light source pilot device

25 is provided for guiding the light. The light source pilot device 25 relates to a light pilot tube which can provide a multi-full reflection for light beams emitted 5 from the light source 24 by virtue of mirror inside the light pilot tube in order to minimize light distracted in the other directions but to concentrate onto the surface of document evenly. Meanwhile reflection as a result of color effect from the document can be focused 10 by a lens 26 to project onto a light source sensor device 27 for sensing. With above-said light source pilot mechanism an optimal projecting distribution can be accomplished onto a slim pen type scanner.

Because the pen type scanner requires a smaller 15 sensing area accordingly the light source sensor device 27 needs less number of pixel. The sensor device 27 relates to a pixel C.C.D. component. Because it requires to sense data transmitted involving lower change in volume it comparatively has managed faster 20 speed in transmission and processing of data. Further because of small scanning width the lens 26 requires image formation evenly only at a small angle so that it involves a relatively low level of requirement with respect to quality and precision to avoid lots of 25 trouble in design in which the conventional scanners have been involved. In order to reduce the influence of the unstable intensity of the projected light due to inclination of the pen type scanner during scanning, or

the difference of the color tint and the gray level between the character and background of the document under scanning, a automatic background cancellation device 30 (ABC) is provided, see FIG. 4.

5 The principle of operation of this device is based on by processing the image signal itself with integration and to use it as a comparison reference to serve the background process purpose. And the control conversion circuit 28 may convert potential signals from the light source sensor device 27, in conjunction with the output from the distance code 29 for sensing horizontal movement distance, into suitable signals for printer port to receive in order to enter the result scanned into the computer mainframe. As said in above,

10 15 automatic background cancellation device (ABC) is used to solve problems created due to inclined utilization of the pen input device and the printing differences of the document under scanning to promote scanning quality, meanwhile to increase the character reading rate and

20 user's easy use.

Referring to FIG.3, a printer connector 4 is used to receive the signals from the control conversion circuit 28, and to connect them to the parallel port of the printer, then, to connect them further to the computer 6, which comprises of: output interface connecting device 41-the printer connector 4 depends mainly upon this device to be connected to the control conversion circuit 28, please refer to FIG 5, There are

two parallel port connectors

411,412, they are connected respectably to printer and computers printer port, while the connector 413 is connected to scanner;

5 Automatic switching circuit 42, which comprises of two 4 bit multiplexer 421, and it is used to switch on and off printer and scanner depending on the variation of auto-feed(AF) signal.

10 Power connecting terminal 43, printer connector 4 depends mainly upon this terminal to be connected to power supply (power adapter, battery or keyboard power).

15 Please refer to FIG. 5, something should be remarked are: The printer connector 4 is provided with an output interface connecting device 41, the automatic switching control circuit 42 and the power connecting terminals 43, wherein except output interface connecting device 41 is provided with terminals to connect to scanner it is also provided with two sets of parallel port connecting terminals 411 and 412 in which connecting terminals 411 can be connected to the computer's printer. Under normal operating condition, i.e, scanner is not driven to work, the required information can pass through printer port via connecting terminal 412 to connecting terminal 411 and printed out by the printer.

When computer sends out a high potential signal via the AF pin of the printer port to the terminal 422

of the automatic switching control circuit 42, the scanner will be driven to work, at this time, signals coming from the scanner will go via terminal 413 to multiplexer 421, then to the computer, which computer sends out a low potential signal via AF pin of the printer port to terminal 422 of the automatic switching control circuit 42, the scanning function of the scanner will become terminated, at this time, signals generated by the printer interface card of the computer will go via terminal 412 to terminal 411, then to multiplexed 421, and go again to the printer to start print, in this manner, the problem printer port of the computer has been connected to the present invention can be eliminated.

15 Therefore the pen type scanner directly linkable to printer port of computer is characterized in by that:

1. Random real-time scanning input by array or by sentence to enable each user to apply the present invention to scanning input in facility.
- 20 2. Without trouble or problem due to secondary editing required, especially for direct entry of some sheets/forms, it may save a great deal of time from irrational editing to accomplish excellent result of direct edit -- "What you get is what you want".
- 25 3. Small light source to economize power consumption and applicable to the use of power supply from cells.
4. Small scanning area applicable to the use of power-

saving C.C.D. with less number of pixels and to allow for the use of lens in general quality.

5. Directly to get words as required to speed up data processing due to less change in data transmission, storage and processing so that overall performance has been advanced; in addition the feature of direct link to printer port to enable installation to get easier and to avoid limitation of different models against interface so that portable feature is ideally accomplished.
- 10 6. Slim and smart outlook design makes easy for holding and handy in use.

Therefore, there has been shown and described a novel pen type scanner directly linkable to printer port of computer which fulfills all the objects and advantages sought therefore. Many changes, modifications, variations and other uses and applications of the subject invention, will, however, become apparent to those skilled in the art after considering the foregoing specification together with the accompanying drawings. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention which is limited only by the claims which 25 follow.

What is claimed is:

1. A pen type scanner which can be directly linkable to printer port of computer including:
a housing resembling a pen shape to enable the user to hold and use in facility;
5 a light source received in the housing, for emitting light beams onto the sheet top;
a scanning position auxiliary device located in the leading end of the housing to help the operation of scanning by array or by paragraph in facility;
10 a lens for receiving image signals transmitted from the reflection of document due to being projected by a light source, and image signals being refracted through the len for sending out;
a light source sensor device received in the housing and for receiving image signals transmitted from the len after refracted to convert such signals into potential signals for outout, comprising a C.C.D. component and requiring a pixel at a minimum height equivalent to a line of characters;
15
20 a distance code for sensing horizontal movement of scanner and sending out a movement signal; and a control conversion circuit mainly for receiving potential signal from the light source sensor device and movement signal from the distance code to convert such

signals into suitable signals to transmission via printer port;
the signals processed and transmitted from the control conversion circuit are being transmitted via printer port into computer mainframe and converted by CAD software into character codes for a variety of applications.

2. The pen type scanner directly linkable to printer port of computer as defined in claim 1 further including a directional device which relates to a directional roller to enable scanner to maintain linear movement during scanning.

3. The pen type scanner directly linkable to printer port of computer as defined in claim 1 or 2 further including a light source pilot device to enable the light source to be mounted at the rear part of the pen shape in order to avoid the pen shape having a large front end, and which is also able to guide light beams to project onto the top of sheet in an even manner.

4. The pen type scanner directly linkable to printer port of computer as defined in claim 3 wherein the scanning position auxiliary device further including a view window for the user to observe and correct scanning position in facility.

25 5. The pen type scanner directly linkable to printer port of computer as defined in claim 4 wherein the light source pilot device further including a light

pilot tube to enable light beams to be confined therein for multi-fold reflection and even projection onto the top of sheet.

6. The pen type scanner directly linkable to printer port of computer as defined in claim 4 wherein
5 the view window further including a center line marking thereon.

7. The pen type scanner as defined in claim 1 which further comprises an automatic background cancellation device for reducing the influence of
10 the unstable intensity of the projected-light due to inclination of the pen type scanner during scanning, or the difference of the color tint and the gray level between the character and background of the document under scanning.

15 8. A pen type scanner as claimed in claim 1 and as herein described.

9. Pen type scanners as herein described with reference to, and as shown in the accompanying drawings.

Relevant Technical Fields

- (i) UK Cl (Ed.M) G4A (AKS) H4F (FAAN, FCA)
 (ii) Int Cl (Ed.5) G06F (3/00) H04N (1/00)

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASE: WPI

Search Examiner
M K REES

Date of completion of Search
19 JULY 1994

Documents considered relevant
following a search in respect of
Claims :-
1 TO 9

Categories of documents

X: Document indicating lack of novelty or of inventive step.

P: Document published on or after the declared priority date but before the filing date of the present application.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

A: Document indicating technological background and/or state of the art.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	EP 0484888 A1 (OMRON CORP)	1
A	EP 0231697 A1 (BA DREYFUS) see abstract	1

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).